

ABSTRACT

A motor allowing multiple degrees of output freedom includes a stator having an interior surface forming at least a portion of a sphere or curved surface and first and second substantially orthogonally positioned stator coils wound on the interior surface.

5 A rotor is fixed to an output shaft and movably supported adjacent the stator with an air gap disposed between the rotor and the stator. The rotor includes a plurality of magnets disposed thereon and is movable along the interior surface in directions defining at least first and second degrees of freedom. Upon energization of the first stator coil, a first magnetic field is established to urge at least a first one of the magnets 10 and the rotor in a direction of the first degree of freedom and upon energization of the second stator coil, a second magnetic field is established to urge at least a second one of the magnets and the rotor in a direction of the second degree of freedom.